Thanks to usage of modern Wireless M-Bus (WMBUS) technology, the AMR radio system, guaranties the new quality of the remote reading of indicators. This device makes possible integration of appliances of other producers in one uniformed reading system. This system allows water meters to be read in case of difficult access and guaranties vast freedom of choosing time and range of data readings.

The low power consumption characterizes the remote reading equipped with the standard configured radio module. It ensures, as well, years of maintenance-free work of the radio module and raises the comfort of the inhabitants since their presence is not necessary while doing readings.

System Advantages

Open – usage of the communication protocol working on the basis of the Wireless M-Bus norm (WMBUS) is an open protocol, so there is possibility to cooperate with the equipment of other manufacturers. **Modular** – allows to easy expansion of the system during exploitation of the water meters according to necessities and abilities of the system's administrator, as well in the walk-by, drive-by system as in the stationary system.

Bidirectional – gives the possibility of receiving data from the radio module (ID number, starting volume, impulse constant, frequency of radio transmissions etc.) for configuration, as well as transmitting present or historical data.

Reliable due to:

usage of the optical flow reading that is fully resistant to external magnetic fields
, alarms' indication - the module take-off, flow reverse and magnet usage,

Elimination of the possibility of human factor mistakes.

Economical – reading of indicators is done without the necessity of entering the premises, any time and in short period of time. All data can be converted into csv files quickly what allows to gain reduction in costs of taking readings and creating databases.

Accuracy – read-out of all the water meters in the building within one day (at one time) can contribute that the discrepancies between readings from the apartment's water meters and the main meter should be lower. **Time saving** – reading from the appliances installed in hard to reach places.

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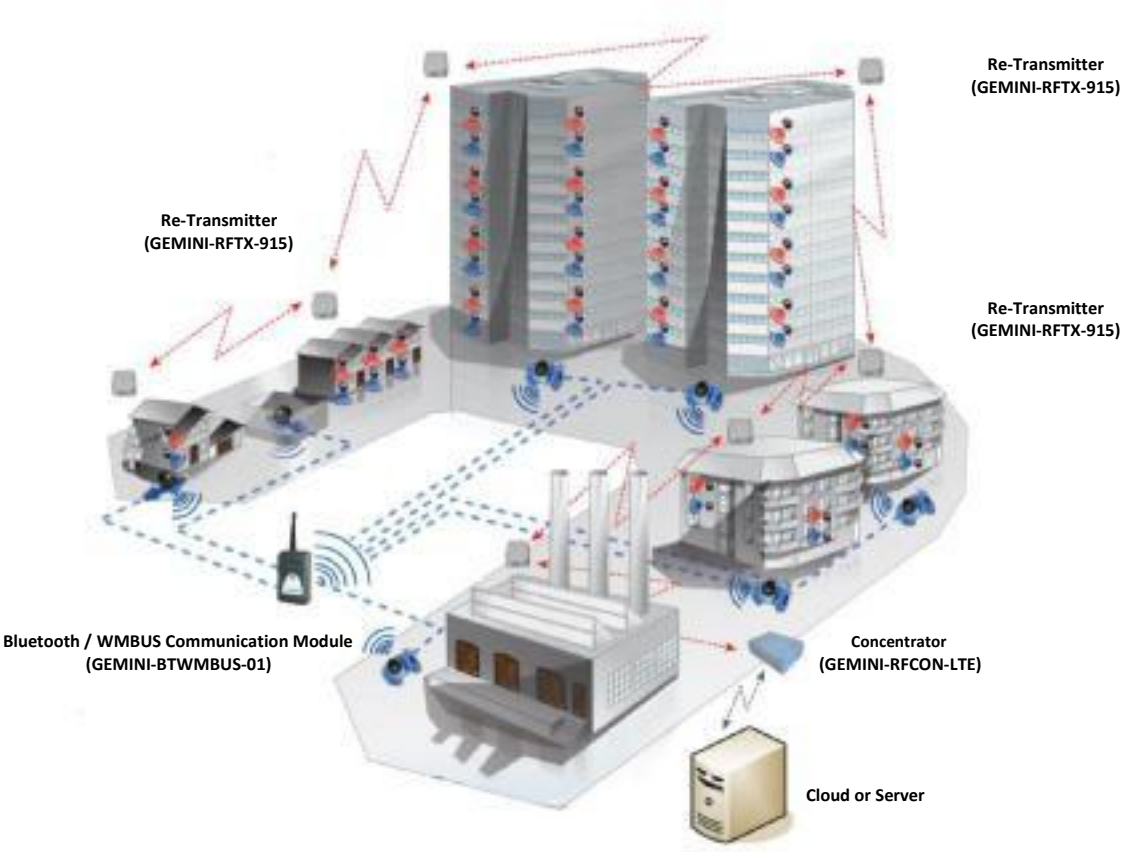
Working schematics of the AMR Radio System



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Data readings

Flow Meter Radio Module (GEMINI-WMBUS-915)

The Flow Meter Radio Module is built on the basis of the newest microprocessor system and is used to the wireless data transmission of the measuring Smart water meters, at distance up to 300m in the open space. The network works on the ISM band of 915MHz and the installed battery can last up to 12 years of constant work. In the appliance was implemented a communication protocol WMBUS in the range of the wireless water meters readings, allowing for two-way data transmission.

Features

The system of optical sensors allowing identification of the current water flow and by taking into consideration the backward flow it gives complete conformity with the indication of the counter.

The reading of data is fully resistant to any external magnetic field interference
Possibility of manual reading and automatic reading
Possibility of signaling of the following alarms:

- module take-off alarm
- Backward flow alarm
- Tamper alarm

Possibility to transmit the following data:

- Maximum flow signalization
- Leak signalization
- Battery running-down

Technical Specifications

Type of the module	GEMINI-WMBUS-915
Application	Direct installation on the counting mechanism on the following water meters: - Apartments (DN 15-20mm) JS-01 and 02 type - Housing (DN 25÷40mm) JS type - Industrial (DN 40÷500mm) MWN; MP; JS class. C; MK; MWN/JS type
Physical characteristics	h = 44; ø = 65.5 [mm]
Protection rating	IP 65
weight	0,06[kg]
	Technical data of the radio transmitter
Transmission speed	100 k bit/s
Data protocol format	Wireless m-bus
Frequency range	915 MHz
Transmission mode	half-duplex
Power output	10 mw
sensitivity	-105 dBm (BER < 10 E-3)

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Bluetooth / WMBUS Communication Module (GEMINI-BTWMBUS-01)

The BTWMBUS is a bridge device between WMBUS RF system and any Bluetooth network. This device listens for incoming radio frames WMBUS, then it sends them via Bluetooth interface to the mobile devices.

Technical Specifications

Dimensions	105 x 65 x 19 mm
range of operating temperature	0 to 60 °C
range of storage temperature	-20 to 70 °C
Power	Universal 90-264VAC 50-60Hz
Backup Power	Li-Ion 1950 mA/h
Technical data of the radio receiver	
Working frequency	915MHz
receiver sensitiveness	> -90 dbm
standard	WMBus
type of the received frames	T1, T2 and CZEKAM
Technical data of the Bluetooth interface	
version	Bluetooth Standard ver. 4.2
Frequency band	2.4GHz
Transmitter power	100mW
Range	100m

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Stationary Data Reading

Re-Transmitter (GEMINI-RFTX-915)

Re-transmitter of the radio signal is an appliance put between radio modules and the concentrator, for broadening the wireless network range. Increase the max allowed distance between those appliances. The re- transmitter works on the basis of renewed broadcast of the received WMBUS border from the measuring appliances from different media, e.g. apartment water meter module at-wmbus-01 type. Application of the re-transmitter allows for greater range of data reading.

Functions

Supplied from the 120V power network

works autonomously - activation consist in switching on the power supply unit only Possibility to extend the transmission route (max 8 re-transmitters)

Integration of the aerial inside the appliance housing.

Technical Specifications

Power supply	
Power supply	Universal 90-264VAC 50-60Hz
Power consumption	<1w
RF Interface	
Frequency	915Mhz frequency
Power transmitting	25mW (according to the ISM limitations)
Sensitivity of the receiver	better than - 100dbm
Mechanical specification	
Dimensions	70 x 66 x 44 mm
Protection rating	IP68
Installation	on wall
Weight	0.19kg
Surrounding environment specification	
Work temperature	0 °C to 55 °C

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Concentrator (GEMINI-RFCON-LTE)

Concentrator is used to gather data transmitted from the radio modules of measuring devices or re-transmitters and transferring them for further analysis throughout the Cellular network, Cloud or servers for further analyses.

Functions

Receiving and saving of the radio frames in WMBUS standard from the specific devices (max 1900 devices) Receiving of the retransmitted radio frames

Configuration of the concentrator by file saved on the FTP server
Servicing and configuration by the RS-485 or RS-232 interface

Technical Specifications

Power supply	
Power supply	Universal 90-264VAC 50-60Hz
Power consumption	1 Watt
Communication	
Data storage memory	max 1900 radio addresses
RF antenna	Built inside the device's housing
4G-LTE Cat 1	Built inside the device's housing
RF Interface	
4G-LTE Cat 1	2110 – 2170 MHz
Mechanical specification	
Dimensions	180 x 126 x 55 mm
Protection rating	IP 68
Installation	on wall
weight	< 0,5 kg
Environment specification	
work temperature	0°C to 55°C

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